the ordinates are given per cent values to permit their application to any initial temperature. These curves are computed by a formula developed from Fourier's conduction equation. They show that the rate of temperature rise at the center of the brick will vary according to the square of the thickness of the brick. These curves apply equally to the cooling period. A curve showing the complete heating and cooling cycle will resemble the hysteresis loop, which shows the heating effect of cyclic magnetic changes upon an iron core.

The firebrick makers in this country list a special checker brick, 10.5X4.5X4.5 in (265X115X115 mm), and a checker brick 2.9X2.75X2.75 in (107X70X70 mm), and some designers use 9-in straights, which give a 2.5-in (63-mm) wall. With a 30-minute period between reversals, the temperature change on the central plane of these bricks may be approximated as follows:

Assuming that the initial temperature throughout the bricks is practically uniform, and the surface is heated through any temperature range for a period of 30 minutes. At the end of this period the temperature of the central plane will have increased to 59 per cent, 94 per cent and 96.5 per cent of the surface tempera-ture, respectively, according to Fig. 153. So that the cooling cycle starts with an initial drop in temperature on the central plane of 41, 6 and 3.5 per cent, respectively.

Fig. 153 shows that the period of time required for these drops will be, respectively, 21, 3 and 2 minutes. During this period the portion of the brick between the center and the surface will be transmitting heat both toward the center and the surface of the brick.

In other words, the thinner the checker brick the higher its heat-storage capacity as compared with the volume it occupies,

the greater the amount of heating surface for the given weight of brickwork and the smaller the heat-storage capacity per unit of surface. When the checker brick are too thin the heat gradient from top to bottom of the checker becomes a curve instead of a straight line. The brick, instead of working on the sloping portion of the curve (Fig. 153) work over on to the flat upper portion of the curve.

A great many of the formulas covering the heat transfer from one substance to another contain a factor which covers the velocity of flow of the gas or liquid which is absorbing or giving